Free and conjugated levels of zearalenone in ewes mated on grass-dominant pasture or chicory

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INTRODUCTION

Zearalenone is an oestrogenic mycotoxin commonly found in New Zealand pastures (di Menna, and *et al.*, 1987). Ingestion of zearalenone by sheep causes reductions in reproductive performance (Smith, and *et al.*, 1990). It is likely that high zearalenone concentrations in pasture around mating will often be sufficient to affect reproductive performance of the ewe. Chicory pastures contain very low zearalenone concentrations and therefore have potential as a feed for ewes prior to and during mating. The aim of this trial was to determine the levels of free and conjugated zearalenone in the blood and urine of ewes grazed on either grass-dominant pasture or chicory prior to and during the mating period, and assess any subsequent effects on reproductive performance.

MATERIALS AND METHODS

Two groups of ewes (n = 60) were treated with a CIDR™ to synchronise oestrous cycles. One group was grazed on pasture for two weeks prior to mating while the remaining group grazed on chicory. Each group was mated on their respective treatments. All ewes were weighed pre-treatment and after mating was completed.

Blood and urine samples were taken pre-treatment and subsequently at weekly intervals during the trial for determination of conjugated and free zearalenone. Mating and returns to service were recorded. Ewes were examined by laparoscopy to determine ovulation rate and all ewes were ultrasound scanned to determine the number of lambs carried.

RESULTS

The levels of zearalenone in the forages were 0.25 ± 0.08 and 3.01 ± 2.50 µg/g for chicory and grass pasture respectively.

There was no significant difference in the amount of conjugated zearalenone in the blood and urine of ewes grazing pasture or chicory. However, there was significantly ($P<0.05$) more free zearalenone present in ewes grazing pasture than in those grazing chicory in both blood (0.29 ± 0.03ng/ml vs 0.12 ± 0.01 ng/ml) and urine (0.13 ± 0.02 ng/ml vs 0.02 ± 0.01 ng/ml) (Table 1).

TABLE 1: Mean (± SEM) levels (ng/ml) of conjugated and free zearalenone in the blood and urine of ewes grazed on grass pasture or chicory prior to mating.

	Blood		Urine	
	Conjugated	Free	Conjugated	Free
Pre-treatment	0.16 ± 0.03	0.22 ± 0.03		
Pasture	0.17 ± 0.02	0.29 ± 0.03	0.09 ± 0.02	0.13 ± 0.02
Chicory	0.24 ± 0.03	0.12 ± 0.01	0.10 ± 0.03	0.02 ± 0.01

The proportion of free to conjugated zearalenone was also higher in ewes grazing pasture representing 67% and 64% of the total zearalenone present in the blood and urine respectively compared with 40% and 16% in blood and urine of ewes grazing chicory.

Ewes grazed on chicory lost significantly more weight than ewes grazed on grass pasture due to restricted chicory availability. There was no significant difference in ovulation rate, lambs carried or the number of returns to service between each treatment group (Table 2).

TABLE 2: Mean (±SEM) weight change, ovulation rate, lambs carried and returns to service of ewes grazed on grass pasture or chicory prior to mating.

	Treatment	
	Pasture	Chicory
Weight Change (kg)	1.20 ± 0.35	-0.61 ± 0.42
Ovulation rate (corpora lutea/ewe)	2.36 ± 0.10	2.26 ± 0.09
Returns to service (%)	24	35
Pregnancy scanning ($N^{O.}$ lambs carried/ewe)	1.53 ± 0.10	1.75 ± 0.07

CONCLUSIONS

Chicory was effective as a feed for reducing free zearalenone levels in grazing ewes prior to mating.

REFERENCES

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